CLAIMS

1.-100. (Cancelled)

101. (New) Variable valve lift device for the lift adjustment of gas-exchange valves of an internal combustion engine with one arrangement or two arrangements of following elements:

a rocker lever with a work curve, which runs in a slotted link actuated by means of a camshaft, whereby the center of rotation of the rocker lever is determined by means of an eccentric, in order to adjust the valve lift of an gas-exchange valve, a means for valve actuation and a spring, which presses the rocker lever against a cam of the camshaft, and a spring, which presses the rocker lever against an eccentric shaft, characterized in that:

a valve lift device (1) shows a rotatable eccentric shaft (3) which consists of several eccentrics (4, 5) and whereby all possible contours of the eccentrics (4, 5) are positioned within a circle, which is formed by the external diameter of a bearing (6, 7) of the eccentric shaft (3).

102. (New) Valve lift device according to claim 101, characterized in that the eccentric shaft (3) is pluggable through a through-going drilling in the cylinder head material, and is bedded directly in the through-going drilling in the cylinder head.

103. (New) Valve lift device according to claim 101, characterized in that the eccentric shaft (3) is mountable as pluggable eccentric shaft (3) from one of the front walls of the cylinder head.

104. (New) Valve lift device according to claim 101, characterized in that the eccentric shaft (3) is bedded in a separate housing, which is connected with the cylinder head.

105. (New) Valve lift device according to claim 104, characterized in that a camshaft (8) is bedded within the housing.

106. (New) Valve lift device according to claim 101, characterized in that in the housing the eccentric shaft (3), rocker levers (9, 10), the camshaft (8) and the slotted link (11) is bedded as pre-mounted unit.

107. (New) Valve lift device according to claim 101, characterized in that the eccentric shaft (3) is bedded within the cylinder head by means of anti-friction bearings.

108. (New) Valve lift device according to claim 101, characterized in that the eccentric contour is formed as arbitrary contour, in particular as circle, and is limited by means of the external diameters of the bearing (6, 7) of the eccentric shaft (3).

109. (New) Valve lift device according to claim 101, characterized in that the maximum diameter of the eccentric shaft (3) is provided as bearing of the eccentric shaft (3) in particular within the cylinder head, and is bedded in the shortest distance to the rocker point and adjustment point of the rocker levers (9, 10).

110. (New) Valve lift device according to claim 101, characterized in that the eccentric shaft (3) is arranged parallelly to the camshaft (8).

111. (New) Valve lift device according to claim 101, characterized in that the eccentric shaft (3) is hydraulically adjustable.

112. (New) Valve lift device according to claim 101, characterized in that the eccentric shaft (3) is adjustable by means of an electric engine, which is provided in an alignment with the camshaft (7) or with the eccentric shaft (3).

113. (New) Valve lift device according to claim 112, characterized in that the axis of the electric engine is provided parallelly to the camshaft axis or parallelly to the eccentric shaft axis.

114. (New) Valve lift device according to claim 101, characterized in that the eccentrics (4, 5) in an arrangement with two or several inlet valves or outlet valves are arranged distortedly

towards each other at an angle α, so that in a rotation position of the eccentric shaft (3) a different valve lift results for the valves (2).

115. (New) Valve lift device according to claim 101, characterized in that in one cylinder head for the actuation of inlet valves and outlet valves several eccentric shafts (3) are provided.

116. (New) Valve lift device according to claim 115, characterized in that the eccentric shafts (3) of several inlet valves or outlet valves differ with respect to the contour of the eccentrics (4, 5).

117. (New) Valve lift device according to claim 116, characterized in that the valves (2) of contiguous cylinders with different eccentric contours are to be actuated by means of the rocker levers (9, 10).

118. (New) Valve lift device according to claim 101, characterized in that camshaft contours for the valves (2), which belong to one cylinder, are formed differently.

119. (New) Valve lift device according to claim 101, characterized in that work contours of the rocker levers (9, 10), which are in contact with the eccentric shaft (3), form a flat plane.

120. (New) Valve lift device according to claim 101, characterized in that work contours of the rocker levers (9, 10), which are in contact with the eccentric shaft (3), form a concave or convex plane.

121. (New) Valve lift device according to claim 101, characterized in that the eccentrics (4, 5) are in contact with a bedded roller of the rocker levers (9, 10).

122. (New) Valve lift device according to claim 101, characterized in that the work contour (12) of the rocker lever (9) is formed differently from the work contour (13) of the second rocker lever (10), which are directly connected with each other by means of an axis (14).

123. (New) Actuator technology for combustion engines with a variable valve control for the lift adjustment of the gas-exchange valves of an internal combustion engine, with a rotatable eccentric shaft, which is bedded within a cylinder head, for the adjustment of the valve lift of a gas-exchange valve, comprising:

an exchangeable and differently formed actuator (101), which is arranged in a housing (102), is arranged bottom-sided at an eccentric shaft (108), which is bedded in a cylinder head, for the distortion thereof, and is mounted by means of mounting elements (103, 104), which are provided at the housing (102), at the cylinder head, whereby by means of a connecting element, which is provided on the eccentric shaft (108), a transfer of the actuator motion to the rotary motion of the eccentric shaft (108) takes place, and whereby by means of exchange of different actuators (101) with the connecting element for the eccentric shaft (108) a change-over from a step-less variable valve lift adjustment to a stepwise change of the valve lift without changes at the cylinder head can be carried out.

124. (New) Actuator technology for combustion engines according to claim 123, characterized in that the connecting element is provided as independent component or as constituent part of the eccentric shaft (108), whereby the independent connecting element is exchangeable together with the actuator (101).

125. (New) Actuator technology for combustion engines according to claim 123, characterized in that the actuator (101) is formed as an electric engine, which is arranged within the housing (102), which acts directly on the eccentric shaft (108).

126. (New) Actuator technology for combustion engines according to claim 123, characterized in that the actuator (101) is formed as lift magnet.

127. (New) Actuator technology for combustion engines according to claim 123, characterized in that the actuator (101) is formed as hydraulic adjustment element.

128. (New) Actuator technology for combustion engines according to claim 123, characterized in that the electric engine or the lift magnet are provided in a black box, at the front walls thereof at the housing (102) mounting elements (103, 104) for the mounting at the cylinder head are provided, which are arranged oppositely towards each other.

129. (New) Actuator technology for combustion engines according to claim 123, characterized in that in a change-over from a step-less variable valve lift adjustment to a stepwise change of the valve lift, the eccentric shaft (108) is identical.

130. (New) Actuator technology for combustion engines according to claim 123, characterized in that for a change-over from a step-less variable valve lift adjustment to a stepwise change of the valve lift, the eccentric shaft (108) is exchangeable modularly.

131. (New) Actuator technology for combustion engines according to claim 123, characterized in that for a change-over from a step-less variable valve lift adjustment to a stepwise change of the valve lift, the corresponding connecting element, which is formed as clutch (107), is exchangeable.

132. (New) Actuator technology for combustion engines according to claim 123, characterized in that the actuator (101) is connected with the eccentric shaft (108) either on the front wall or on the backside of the cylinder head.

133. (New) Actuator technology for combustion engines according to claim 123, characterized in that for different embodiments the actuator (101) is not directly aligned with the eccentric shaft (108), but that between the actuator (101) and the eccentric shaft (108) an intermediate gear box is provided.

134. (New) Actuator technology for combustion engines according to claim 123, characterized in that the change-over of the gas-exchange valves (111, 112) from a step-less variable valve lift adjustment to a stepwise change of a valve lift for inlet valves and outlet valves, which is taken by means of the exchange of the actuators (101), is provided in such a manner that at both valve sides a fully variable or stepwise or on one valve side a stepwise and on one other valve side a fully variable change of the valve lift for the gas-exchange valves (111, 112) is provided.

135. (New) Actuator technology for combustion engines according to claim 123, characterized in that for a step-less variable valve lift adjustment the valve lift is detected by means of a sensor, which is provided at the cylinder head, for the position feedback of the valve lift of the gas-exchange valves (111, 112).

136. (New) Actuator technology for combustion engines according to claim 127, characterized in that the actuator (101), which is provided for the gas-exchange valves (111, 112) at the inlet valve side and outlet valve side with a hydraulic adjustment element, has a rotor (115), which takes different switching positions.

137. (New) Actuator technology for combustion engines according to claim 136, characterized in that the actuator (101) with the hydraulic adjustment element is formed from plastics, whereby the rotor (115) thereof has at least one rotor wing (116).

138. (New) Actuator technology for combustion engines according to claim 137, characterized in that the actuator (101) with the hydraulic adjustment element is fed with hydraulic oil pressure from the engine circulation.

139. (New) Actuator technology for combustion engines according to claim 138, characterized in that direction-control valves (122, 126, 127) for the actuation of the actuator

(101) with the hydraulic adjustment element are positioned within the actuator (101), preferably coaxially to the actuator center line (118).

140. (New) Device for the variable valve control or adjustment, in particular of gas-exchange valves of an internal combustion engine, comprising:

a camshaft adjustment device (230); and

a rotatable, preferably within a cylinder head, bedded eccentric shaft (208) with a cam contour (209, 210) per gas-exchange valve (211, 212), for control or adjustment of the valve lift of at least on gas-exchange valve (211, 212), as well as one actuator (201), which is provided for the distortion of the eccentric shaft (208) at the bottom thereof.

141. (New) Device according to claim 140, wherein the camshaft adjustment device (230) works according to the wing cell principle or works by means of a piston, which is axially shiftable on a beveled gear tooth tailing.

142. (New) Device according to claim 140, wherein the camshaft adjustment is carried out by means of the camshaft adjustment device (230) stepwise or step-less.

143. (New) Device according to claim 140, wherein the actuator is arranged in a housing (202), and is mounted exchangeable at the cylinder head by means of mounting elements (203, 204), which are provided at the housing (202).

144. (New) Device according to claim 140, wherein by means of a connecting element, which is provided between eccentric shaft (208) and actuator (201), a transfer of the actuator motion to the rotary motion of the eccentric shaft (208) takes place.

145. (New) Device according to claim 140, wherein by means of exchange of different actuators (201), preferably together with the connecting element, a change-over from a step-less

variable valve lift adjustment to a stepwise change of the valve lift without changes at the cylinder head can be carried out.

146. (New) Device according to claim 140, wherein an actuator for the step-less variable valve lift adjustment or an actuator for the stepwise change of the valve lift or an actuator for the step-less variable and stepwise change of the valve lift is provided.

147. (New) Device according to claim 140, wherein the connecting element is provided as independent component or as constituent part of the eccentric shaft (208), whereby the independent connecting element is exchangeable together with the actuator (201).

148. (New) Device according to claim 140, wherein the actuator (201) is formed as an electric engine, which is arranged in the housing (202), which acts directly on the eccentric shaft (208).

149. (New) Device according to claim 140, wherein the actuator (201) is formed as lift magnet or as hydraulic adjustment element.

150. (New) Device according to claim 140, wherein the electric engine or the lift magnet is provided in a black box, at the front wall thereof at the housing (202) mounting elements (203, 204) for the mounting at the cylinder head are provided, which are arranged oppositely towards each other.

151. (New) Device according to claim 140, wherein in the change-over from a step-less variable valve lift adjustment to a stepwise change of the valve lift, the eccentric shaft (208) is exchangeable modularly.

152. (New) Device according to claim 140, wherein in a change-over from a step-less variable valve lift adjustment to a stepwise change of the valve lift, the eccentric shaft (208) is identical.

153. (New) Device according to claim 140, wherein in a change-over from a step-less variable valve lift adjustment to a stepwise change of the valve lift, the corresponding clutch (207) is exchangeable.

154. (New) Device according to claim 140, wherein the actuator (201) is connected with the eccentric shaft (208) either on the front wall or on the backside of the cylinder head.

155. (New) Device according to claim 140, wherein in different embodiments the actuator (201) is not aligned directly with the eccentric shaft (208), however, an intermediate gear box is provided between the actuator (201) and the eccentric shaft (208).

156. (New) Device according to claim 140, wherein the change over of the gas-exchange valves (211, 212) from a step-less variable valve lift adjustment to a stepwise change of the valve lift for inlet valves and outlet valves, which is taken by means of the exchange of the actuators (201), is provided such that at both valve sides a fully variable, partially fully variable, stepwise, or on both valve sides a stepwise change of the valve lift for the gas-exchange valves (211, 212) is provided, respectively.

157. (New) Device according to claim 140, wherein in a step-less variable valve lift adjustment the valve lift is measured by means of a sensor, which is provided at the cylinder head, with a position feedback of the valve lift of the gas-exchange valves (211, 212).

158. (New) Device according to claim 140, wherein the actuator (201), which is provided for the gas-exchange valves (211, 212) at the inlet valve side and outlet valve side with a hydraulic adjustment element, has a rotor (215), which takes different switching positions.

159. (New) Device according to claim 140, wherein the actuator (201) with the hydraulic adjustment element is formed from plastics, whereby the rotor (215) thereof has at least one rotor wing (216).

160. (New) Device according to claim 140, wherein the actuator (201) with the hydraulic adjustment element is fed with hydraulic oil pressure from the engine circulation.

161. (New) Device according to any claim 140, wherein the direction- control valves (222, 226, 227) for the actuation of the actuator (201) with the hydraulic adjustment element are positioned within the actuator (201), preferably coaxially to the actuator center line (218).

162. (New) Internal combustion engine, which has at least one device according to claim 140.

163. (New) Internal combustion engine according to claim 162, with two or more camshafts, which has at least at one of the camshafts a device according to claim 140 and at the further camshafts only a stepwise or step-less cam adjustment device.

164. (New) Internal combustion engine according to claim 162, with two or more camshafts, for which each camshaft has a device according to claim 140.

165. (New) Device (310) for the variable valve lift adjustment, in particular of gas-exchange valves (312, 314) of an internal combustion engine with one or several arrangement(s) of following elements:

at least one rocker lever (332, 334), which runs in a slotted link (338) actuated by means of a camshaft (336);

a means for valve actuation (350, 352), which is engaged with the rocker lever (332, 334);

a spring (360), which presses the rocker lever (332, 334) against the camshaft (336); and

a multi-part eccentric shaft (316) for the adjustment of the valve lift, which has one or several eccentric(s) (322, 324).

166. (New) Device (310) according to claim 165, which shows between camshaft (336) and rocker lever (332, 334) a push rod, an intermediate lever as well as an adjustment element.

167. (New) Device (310) according to claim 165, wherein the eccentric shaft (316) shows a coaxial construction with an eccentric (322, 324) per gas-exchange valve (312, 314).

168. (New) Device (310) according to claim 165, wherein each eccentric shaft part (318, 320), which can be adjusted individually and independently from the other eccentric shaft parts (318, 320), has an eccentric (322, 324).

169. (New) Device (310) according to claim 165, wherein the shape of the eccentrics (322, 324) is the same or is different from each other.

170. (New) Device (310) according to claim 165, wherein the eccentric shaft parts (318, 320) of the eccentric shaft (316) are adjustable by means of at least one actuator (340).

171. (New) Device (310) according to claim 165, wherein in the use within a cylinder head for the actuation of inlet valves and outlet valves several eccentric shafts (316) are provided.

172. (New) Device (310) according to claim 165, wherein for gas-exchange valves (312, 214) of contiguous cylinders different forms of the eccentrics (322, 324) are provided.

173. (New) Process for the variable valve lift adjustment, in particular of gas-exchange valves (312, 314) of an internal combustion engine, using a device (310) according claim 165, wherein each individual eccentric (322, 324) can be adjusted individually and independently from the other eccentrics (322, 324) of the eccentric shaft (316).

174. (New) Process according to claim 173, wherein the individual eccentric shaft parts (318, 320) of the eccentric shaft (316) are adjusted with the corresponding eccentrics (322, 324) by means of one or several actuators.

175. (New) Internal combustion engine, which has at least one device (310) according to claim 165.

176. (New) Variable valve lift control system for a combustion engine with underneath camshaft for the adjustment of a valve lift and of an opening time of at least one inlet valve and/or outlet valve load-dependently and rotational speed-dependently as well as for the switch-off of individual cylinders of an internal combustion engine, whereby rocker levers or swing arms, which are driven by means of cams of a camshaft, actuate the inlet valve and outlet valve by means of the engagement into further rocker levers or swing arms, characterized in:

an underneath camshaft (401) drives by means of a push rod (403) via a hydraulic valve clearance adjustment element (402) a rocker lever (404), which has a curve contour (414), which runs on a roller (413) of an intermediate lever (409), which is moveable by means of two rollers (415), which are arranged on one axis, in slotted links (410), which are connected in a fixed manner with a cylinder head, whereby the intermediate lever (409) supports with a contour at an adjustment bar (411), which is conducted within a housing, and rolls with a work curve (416) on a roller (408) of a cam follower (407), and whereby the cam follower (407) acts with engagement areas, which are provided bottom-sided, respectively, on a hydraulic adjustment element (406) and a valve (405) of a combustion engine.

177. (New) Variable valve lift control system according to claim 176, characterized in that by means of a shift of the adjustment bar (411), the region of the work curve (416) of the intermediate lever (409) is adjusted, which is applied with the roller (408) of the cam follower (407) in a rotation of the camshaft (401).

178. (New) Variable valve lift control system according to claim 176, characterized in that the work curve (416) of the intermediate lever (409) is constructed from several individual regions, which are connected with each other by means of transition radii.

179. (New) Variable valve lift control system according to claim 178, characterized in that the individual regions are constructed such that a first region determines a zero-lift, which is defined by means of a circular arc around the center of the roller (413), at it following a second region, which defines the opening ramp, and at it following a part-lift region and a full-lift region.

180. (New) Variable valve lift control system according to claim 179, characterized in that a spline is laid over the whole curve region (416) in order to connect the curve regions with each other without a shock.

181. (New) Variable valve lift control system according to claim 176, characterized in that by means of an embossment of the camshaft (401), by means of the curve contour (414) of the rocker lever (404) and by means of the work curve (416) of the intermediate lever (409) the opening characteristic of the valve is determinable.

182. (New) Variable valve lift control system according to claim 176, characterized in that the work curve (416) is arranged on the cam follower (407) and that the roller (408) is constituent part of the intermediate lever (409).

183. (New) Variable valve lift control system according to claim 176, characterized in that the rocker level (404) has an additional roller (412), which is in direct connection with the roller (413) of the intermediate lever (409), which runs at the slotted link (410) of the rocker lever (404).

184. (New) Variable valve lift control system according to claim 176, characterized in that the intermediate lever (409) is conducted axially through a leg spring (417), or through a slotted link (410) with a lateral line (421).

185. (New) Variable valve lift control system according to claim 176, characterized in that the intermediate lever (409) supports with a circular contour (419) at the adjustment bar (411).

186. (New) Variable valve lift control system according to claim 176, characterized in that the intermediate lever (409) supports with a circular contour (419) on a roller, which is bedded in a friction bearing or anti-friction bearing.

187. (New) Variable valve lift control system according to claim 176, characterized in that the adjustment bar (411) has a contact contour (420), in particular circular arc-shaped, concave, ascending and sloping.

188. (New) Variable valve lift control system according to claim 176, characterized in that for internal combustion engines with several inlet valves and outlet valves the control of the valves with different valve lifts and coupled therewith with different opening times takes place by means of several adjustment bars (411), which are adjustable by means of individual actuators, and whereby the corresponding set value is calculated by means of a process-controlled engine characteristic or by means of a program-controlled model.

189. (New) Variable valve lift control system according to claim 176, characterized in that for Otto engines and Diesel engines by means of an individual control of the valve lift of in particular two inlet valves the twist of the in-cylinder flow is adjustable.

190. (New) Variable valve lift control system according to claim 176, characterized in that the adjustment element (406) is omitted.

191. (New) Variable valve lift control system according to claim 176, characterized in that no valve clearance adjustment element (402) is provided.

192. (New) Variable valve lift control system according to claim 176, characterized in that the intermediate lever (409) is formed from aluminum or from titanium alloy.

193. (New) Variable valve lift control system according to claim 176, characterized in that the rollers (408, 412, 413, 415) are bedded in anti-friction bearings.

194. (New) Variable valve lift control system according to claim 176, characterized in that the rollers (408, 412, 413, 415) are bedded in anti-friction bearings or friction bearings.

195. (New) Variable valve lift control system according to claim 176, characterized in that the rocker lever (404) is bedded in an anti-friction bearing or a friction bearing.

196. Variable valve lift control system according to claim 176, characterized in that no adjustment elements (402, 406) are provided, whereby the valve clearance is mechanically adjustable at the rocker lever (404).